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New Afrotropical species of *Wiedemannia* Zetterstedt (Diptera, Empididae, Clinocerinae)

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Abstract

Two new species of Afrotropical *Wiedemannia* Zetterstedt are described: *W. kilimanjaro* **sp. nov.** (Tanzania), *W. londti* **sp. nov.** (Malawi). Both species are illustrated and an updated key to Afrotropical species of *Wiedemannia* is provided. The distributions of all Afrotropical species of *Wiedemannia* are mapped and the disjunct distribution briefly discussed.

Keywords

aquatic dance flies, Malawi, new species, Tanzania

Introduction

Aquatic dance flies of the subfamily Clinocerinae (Diptera: Empididae) are associated with streams, rivers and boggy areas and found worldwide, except Antarctica. Species are found from lowlands to high altitudes, usually associated with less human-impacted habitats. In the Afrotropical Region, there are 30 described species and six genera of Clinocerinae (Sinclair 1999a, b; Sinclair and Daugeron 2017). Some additional 18 undescribed species of Afrotropical Clinocerinae have so far been identified (Sinclair, unpubl. obs.).

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The genus *Wiedemannia* Zetterstedt are among the larger-sized flies of Clinocerinae and often occur in broader streams and rivers. The Afrotropical species of *Wiedemannia* form a monophyletic group, supported by characters of the male terminalia (i.e., prolongation of subepandrial sclerite and base of distiphallus with paired spicule-clothed membranous sacs and attached at antero-apical margin of phallic shaft) (Sinclair 1999a, b) and appears to be most closely related to the *W. zetterstedti* group based on several long, erect setae on the fore coxae and acrostichal setae greatly reduced, only a few present anterior to second dorsocentral setae (Sinclair 1999a, b; Ivković et al. 2019, 2022). The Afrotropical species of *Wiedemannia* are divided into three species-groups: *W. rudebecki*-group from southern Africa (*W. edendalensis* Smith, *W. hughesi* Smith, *W. gorongoza* Smith, *W. rudebecki* Smith), the *W. reducta*-group from Uganda (*W. reducta* Garrett Jones, *W. submarina* Garret Jones) and the *W. aquatica*-group from Kenya (*W. aquatica* (Becker), *W. kenyae* Sinclair) (Sinclair 2003). In addition to the above eight species, two new species from Malawi and Tanzania (Sinclair and Daugeron 2017) are described in the present study.

Materials and methods

This study is based on material loaned from the following institutions:

NMSA KwaZulu-Natal Museum, Pietermaritzburg, South Africa;
ZMUC Natural History Museum of Denmark, Zoological Museum, Copenhagen, Denmark.

Label data for primary types are cited from the top downward, with the data from each label in quotation marks. Labels are cited in full, with original spelling, punctuation, and date, and label lines are delimited by a slash (/). The repository of each type is given in parentheses. Terms used for adult structures primarily follow those of Cumming and Wood (2017). Photographs of pinned specimens were taken with a Leica camera model DFC5400 using Leica Application Suite X. SimpleMappr (Shorthouse 2010) was used to plot the distribution of each species.

Taxonomy

***Wiedemannia kilimanjaro* sp. nov.**
https://zoobank.org/E7CC8AE9-ABA7-4060-9A42-961245D1DE75

Recognition. This species is distinguished by its fully developed wings, numerous slender setae scattered over the hypandrium and three inner lobes of the elongate clasping cercus.

Etymology. This species is a noun in apposition, named after the type locality.

Description. Male. Holotype mostly dark brown (see Remarks) (Fig. 4). ***Head*:** ocellar setae lost; several pairs of short posterior setulae; 3–5 upper postocular setae strong,

spine-like, not overlapping eye; lower postocular setae slender, longer. Genal width one-fourth height of eye. Antenna brown; scape slightly longer than pedicel; postpedicel pointed ovate; arista-like stylus short, tip blunt, about twice as long as postpedicel.

***Thorax*:** antepronotum with strong, long lateral seta, nearly as long as postpronotal seta. Proepisternum with several long, brown setae. Mesonotum with 5 rather weak dorsocentral setae, with several short setulae intermixed; several short acrostichal setulae, anterior to second dorsocentral seta; 1 postpronotal seta, with several short, dark setulae; 2 notopleural setae, lower seta weaker, shorter than upper; 1 presutural supra-alar seta; 1 postsutural supra-alar seta, with several setulae; 1 postalar seta; 1 pair short scutellar setae, similar to dorsocentral setae, with dark marginal and discal setulae. Laterotergite with cluster of brown setae.

***Wing*:** length 4.6 mm; membrane infuscate, veins darker; basal costa seta not extending to humeral crossvein. Origin of veins M_1 and M_2 widely separated at end of cell dm, subequal to length of crossvein r-m. Vein CuA+CuP absent. Pterostigma not visible. Costal margin with short, strong erect setae beyond apex of Sc. Halter with dark knob.

***Legs*:** uniformly covered with rows of small dark setulae, slightly longer on ventral side of fore femur; fore femur without strong preapical setae; fore coxa with 2 long erect setae; hind tibia with 4–5 erect, spine-like posterodorsal setae.

***Abdomen*:** concolourous with thorax, covered in short setae. Tergite 8 narrow, band-like.

***Terminalia* (Figs 1, 2):** hypandrium longer than length of epandrium, with numerous long, slender setae extending onto lateral face; membrane at base of hypandrium with sclerotized strips. Epandrium subtriangular, densely covered with dark, long setae; surstylus with snout-like apex and long lateral setae. Subepandrial sclerite with pointed apex, projecting free between bases of clasping cercus. Clasping cercus L-shaped in lateral view; apex rounded; inner face without peg-like setae; subequal in length to height of epandrium; inner base expanded medially into one elongate lateral, tapered lobe and medially into forked process with stout setae on rounded lobe. Cercal plate with 4 long setae confined to upper sclerite. Phallus slightly arched; apex of shaft with pair of membranous sacs on either side; distiphallus sinuous, tapered, without swelling in middle.

Female. Unknown.

Distribution. This species is known only from Mt. Kilimanjaro, Tanzania (Fig. 8).

Type material. ***Holotype*** ♂, labelled (Fig. 5): "Tanzania, Kilimandjaro/ Shira Plateau [-3.054°, 37.275°], 4000 m./ 27.-28. Dec. 1975/ N. Møller Andersen leg."; "HOLOTYPE/ Wiedemannia/ kilimanjaro/ Sinclair" [dissected] (ZMUC).

Remarks. *Wiedemannia kilimanjaro* is most closely related to *W. kenyae* on the basis of the elongate, narrow clasping cercus and numerous slender setae on the hypandrium and assigned to the *W. aquatica* group.

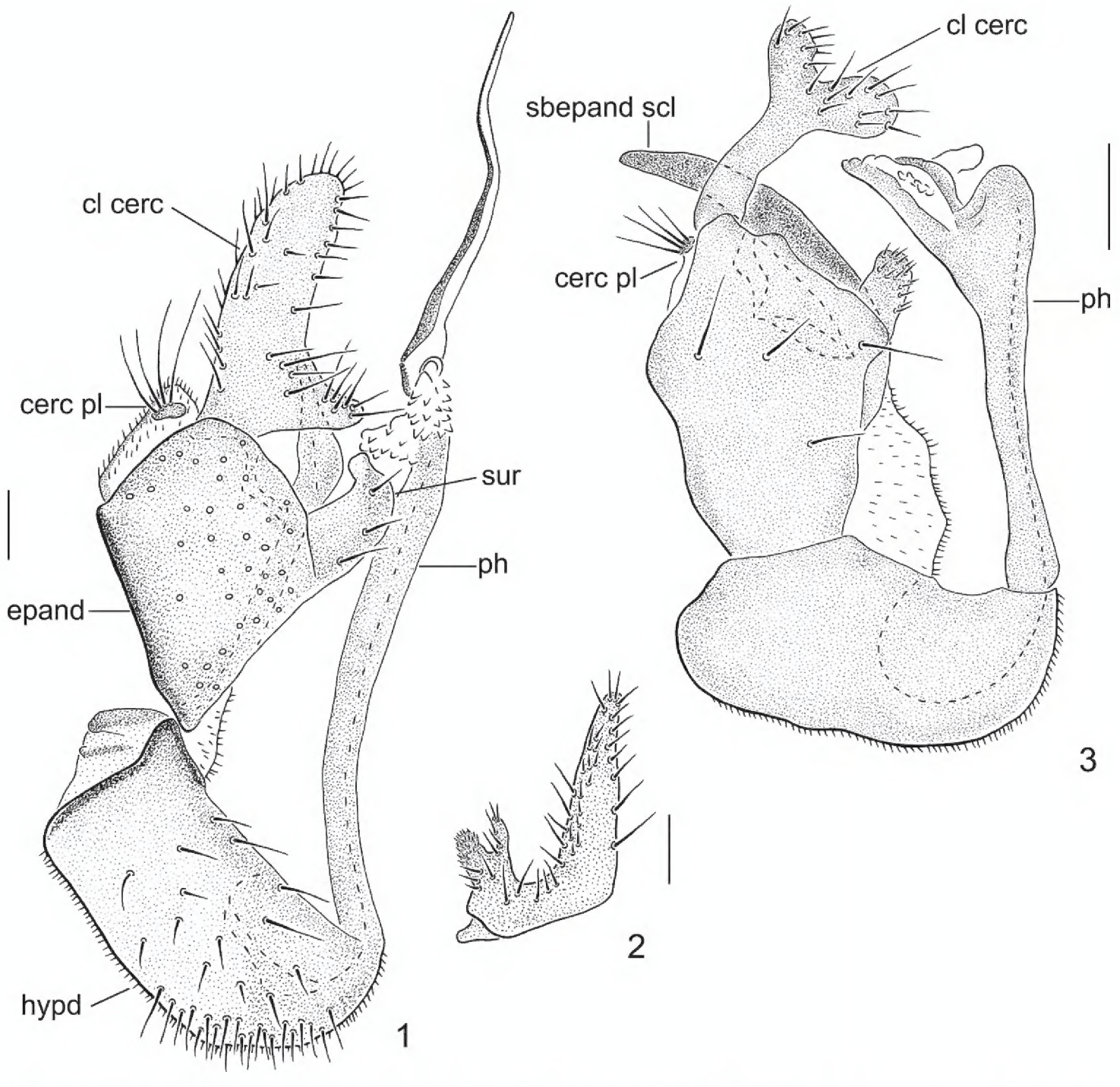
The holotype is dark brown, which is unusual for specimens of *Wiedemannia*, which usually have distinct bluish pruinescence. Some bluish pruinescence is visible at certain angles, but the brownish colouration could have resulted during the preservation process. Additional specimens of this species will certainly assist in resolving its true colouration.

***Wiedemannia londti* sp. nov.**
https://zoobank.org/23A887FB-D28F-49D1-BA14-78C77CD16AC2

Recognition. This species is distinguished by its fully developed wings, fore coxae without erect, outstanding setae, clasping cercus with narrow base and Y-shaped apex, blade-like subepandrial sclerite and oddly shaped phallus, with reduced distiphallus.

Etymology. It is my pleasure to name this species in honour of Jason Londt. Jason was very welcoming to me as a young visitor to the Natal Museum in 1994 and I always look forward to meeting up with him at meetings of the International Congress of Dipterology.

Description. Male. ***Head*:** face, gena and occiput with blue pruinescence (Fig. 6); vertex brown. Face with faint brownish median stripe; apex of facial cleft velvety brown with bright oval blue pruinescent patches on either side of cleft in frontal view. Ocellar



Figures 1–3. Male terminalia of Afrotropical *Wiedemannia* **1** *W. kilimanjaro* sp. nov.. lateral view **2** *W. kilimanjaro* sp. nov., clasping cercus, anterior view **3** *W. londti* sp. nov., lateral view. Scale bars: 0.1 mm. Abbreviations: cerc pl – cercal plate; cl cerc – clasping cercus; epand – epandrium; hypd – hypandrium; ph – phallus; sbepand scl – subepandrial sclerite; sur – surstylus.

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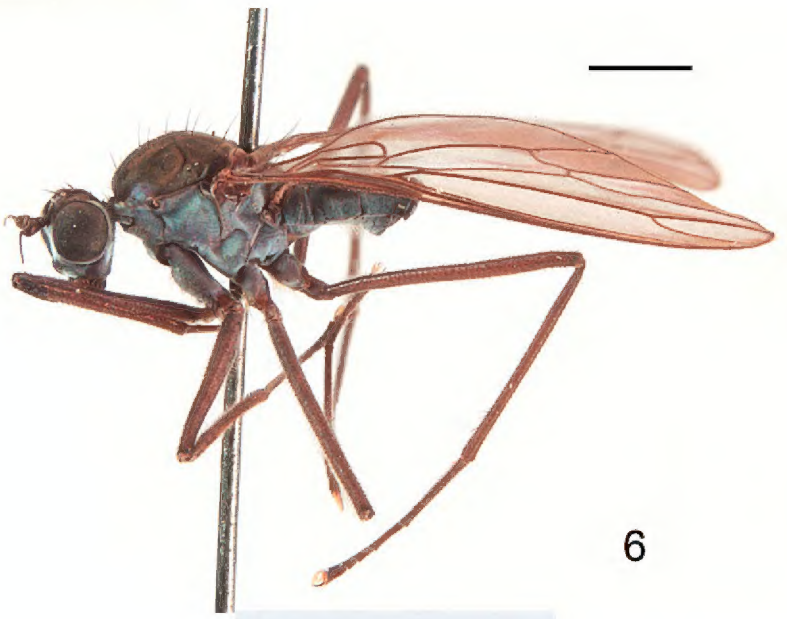

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Figures 4–6. Afrotropical *Wiedemannia*, holotypes **4** *W. kilimanjaro* sp. nov., habitus, lateral view **5** *W. kilimanjaro* sp. nov., labels **6** *W. londti* sp. nov., habitus, lateral view **7** *W. londti* sp. nov., labels. Scale bar: 1.0 mm (**4**); 0.75 mm (**6**).

triangle thinly pruinescent; ocellar setae long, slender, longer than postpronotal seta; several pairs of short posterior setulae; 4 upper postocular setae strong, spine-like, not overlapping eye; lower postocular setae slender, longer. Genal width one-third height of eye. Antenna brown; scape slightly longer than pedicel; postpedicel pointed ovate; arista-like stylus short, tip blunt, about twice as long as postpedicel.

***Thorax*:** pleura and postpronotal lobe with blue pruinescence; scutum brown with faint pair of black vittae. Antepronotum with strong, long lateral seta, nearly as long as postpronotal seta. Proepisternum with several long, pale setae. Mesonotum with 5 long dorsocentral setae, with several short setulae intermixed; several short acrostichal setulae, anterior to second dorsocentral seta; 1 postpronotal seta, with several short, dark setulae; 2 notopleural setae, lower seta weaker, shorter than upper, with numerous black setulae; 1 presutural supra-alar seta, with numerous black setulae; 1 postsutural supra-alar seta, with several setulae; 1 postalar seta; 1 pair scutellar setae, longer than dorsocentral setae, with dark marginal and discal setae and setulae. Laterotergite with cluster of pale setae.

***Wing*:** length 4.1 mm; membrane infuscate, veins darker; basal costa seta not extending to humeral crossvein. Origin of veins M_1 and M_2 widely separated at end of cell dm, subequal to length of crossvein r-m. Vein CuA+CuP absent. Pterostigma not visible. Costal margin with short, strong erect setae beyond apex of Sc. Halter with dark knob; base of shaft pale brown.

***Legs*:** coxae with blue pruinescence, concolourous with pleura; remaining leg segments dark brown. Fore femur with posteroventral row of fine setae, shorter than width of femur; fore tibia with erect ventral setae, shorter than width of tibia; otherwise uniformly covered with rows of small dark setulae; fore femur without strong preapical setae; fore coxa without erect setae; hind tibia with 2–3 pairs of strong ventral setae.

***Abdomen*:** blue pruinescent, concolourous with thorax, covered in short setae. Tergite 8 narrow, band-like.

***Terminalia* (Fig. 3):** hypandrium robust, subequal to length of epandrium. Epandrium subrectangular, produced dorsally; surstylus rounded, knob-like, with several marginal setulae. Clasping cercus arched, Y-shaped in lateral view; apical lobes, broadly rounded; inner face without peg-like setae; shorter than height of epandrium; without inner basal lobes. Subepandrial sclerite robust, blade-like, with pointed apex, projecting free beyond bases of clasping cercus. Cercal plate with 4 long setae confined to upper sclerite. Phallus straight; apex of shaft without membranous sacs, broadly rounded; apex of shaft prolonged anteroapically as slender process; distiphallus greatly reduced.

Female. Unknown.

Distribution. This species is known only from the type locality in Malawi (Fig. 8).

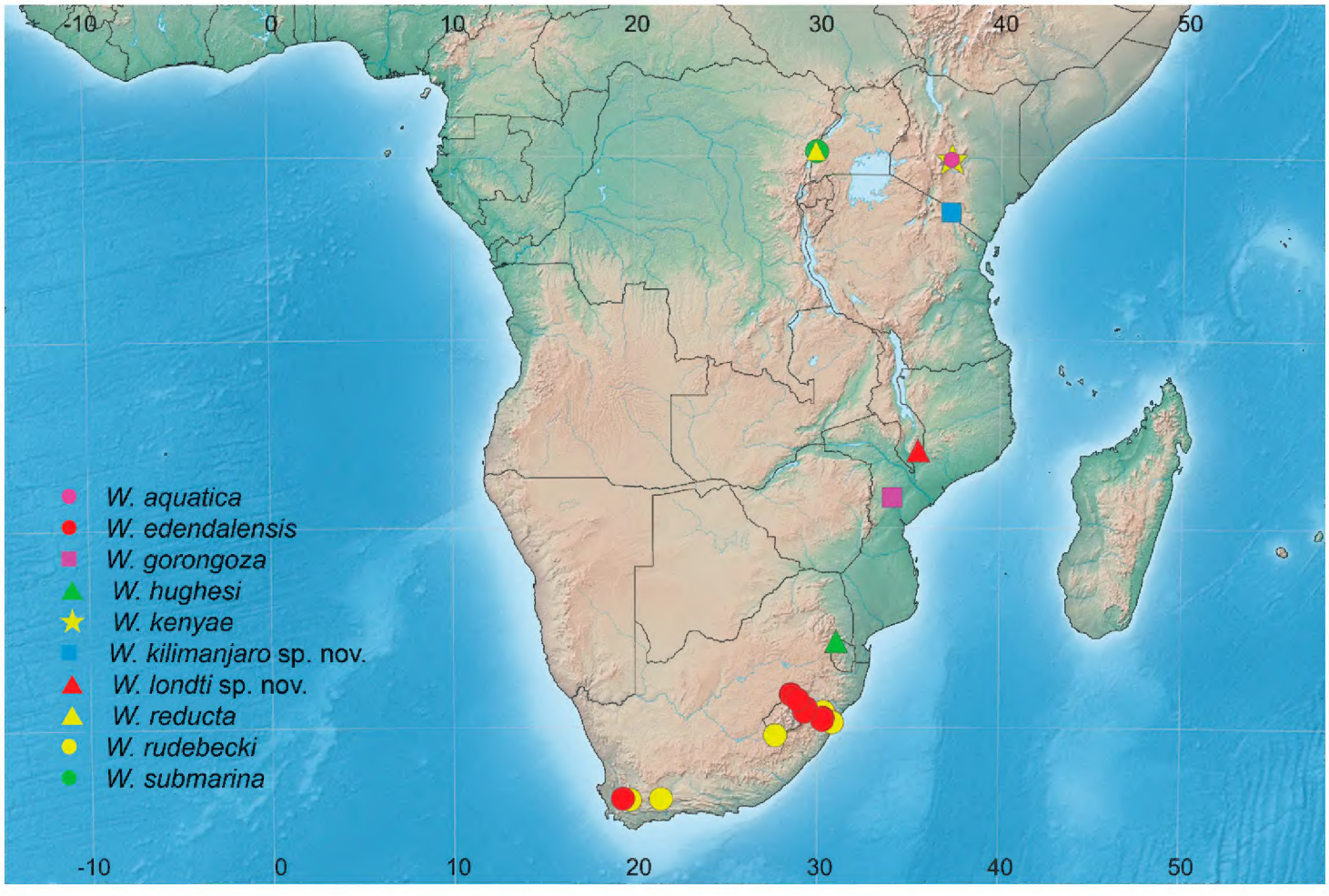

Figure 8. Distribution of *Wiedemannia* in the Afrotropical Region.

Type material. ***Holotype*** ♂, labelled (Fig. 7): "MALAWI Mulanje Mnt./ Likabula river valley [-15.938°, 35.519°]/ 28–30.xi.1980 1535Dc/ 1000m Stuckenberg &/ Londt Riverine/ Brachystegia woodland"; "HOLOTYPE/ Wiedemannia/ londti/ Sinclair" [dissected] (NMSA).

Remarks. This is the first species of Empididae to be described from Malawi. *Wiedemannia londti* is most similar to the odd South African species, *W. hughesi* with absence of erect setae on the fore coxae, enlarged hypandrium and reduction of the distiphallus.

Key to males of Afrotropical species of *Wiedemannia*

1 Wings greatly reduced and strap-like ..... ***W. reducta* Garrett Jones**
– Wings normally developed..... **2**
2 Fore coxae without 2–3 erect setae; apical filament of phallus or distiphallus greatly reduced; apex of phallic shaft broader than base, without membranous sacs..... **3**
– Fore coxae with 2–3 erect setae; apical filament of phallus or distiphallus long and slender; apex of phallic shaft at most slightly broader than base, with membranous sacs..... **4**
3 Clasping cercus deeply divided into separate lobes; phallus strongly bent near mid-length (Sinclair 1999b, fig. 19)..... ***W. hughesi* Smith**
– Clasping cercus with apex shallowly divided into forked, broadly rounded paired lobes; phallus nearly straight (Fig. 3) ..... ***W. londti* sp. nov.**
4 Clasping cercus deeply U-shaped (Sinclair 1999b, fig. 21) ..... ***W. rudebecki* Smith**
– Clasping cercus not deeply U-shaped..... **5**
5 Clasping cercus mitten-shaped in lateral view **6**
– Clasping cercus slender with expanded base in lateral view **8**
6 Apex of phallic shaft somewhat expanded (Sinclair 1999b, fig. 18) ..... ***W. edendalensis* Smith**
– Apex of phallic shaft slender, not expanded..... 7
7 Clasping cercus with distinct, broadly rounded anterior lobe; posterior lobe of clasping cercus expanded posteriorly (Smith 1969, fig. 378) ..... ***W. gorongoza* Smith**
– Clasping cercus with weakly developed and broadly rounded anterior lobe; posterior lobe of clasping cercus expanded dorsally (Sinclair 1999a, fig. 5) ... ***W. submarina* Garrett Jones**
8 Clasping cercus without distinct inner basal lobes; surstylus short and rounded (Sinclair 1999a, fig. 4)..... ***W. kenyae* Sinclair**
– Clasping cercus with distinct inner basal lobes; surstylus truncate or with attenuated apex..... **9**
9 Clasping cercus with pair of separate inner basal lobes; surstylus truncate and broad (Sinclair 1999a, figs 2, 3) ..... ***W. aquatica* (Becker)**
– Clasping cercus with single inner basal lobe, divided apically; surstylus with attenuated and hooked apex (Figs 1, 2)..... ***W. kilimanjaro* sp. nov.**

Discussion

There are now 10 described species of *Wiedemannia* in the Afrotropical Region. The species are rather disjunct in Africa (Fig. 8) and are mostly confined to > 2000 m in the Afromontane region of the tropics, but reaching near sea-level in more temperate latitudes of southern Africa (Sinclair 1999a, b). The genus occurs in cooler water environments with rocky substrates. The geographical distribution and evolution of the group in Africa was discussed by Sinclair (1999a). Most collections for Clinocerinae have focused on South Africa. Greater collecting efforts throughout Africa are likely to produce additional records and species.

Acknowledgements

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